IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Paul B #10

IN RE APPLICATION OF: :

TAKAYUKI YAMAMOTO, ET AL. : EXAMINER: UHLIR, N.J.

SERIAL NO. 10/085,081 :

FILED: MARCH 1, 2002 : GROUP ART UNIT: 1773

FOR: METAL SHEET WITH
ANTICORROSIVE COATING

DECLARATION UNDER 37 C.F.R. § 1.132

ASSISTANT COMMISSIONER FOR PATENTS
ALEXANDRIA, VA 22313-1450

SIR:

I, Hiroo Shige, a citizen of Japan, hereby declare and state that:

1. I have a degree of Master of Engineering, which was conferred upon me in 1993 by Kyoto Institute of Technology located in Kyoto prefecture, Japan.

2. I have been employed by Kabushiki Kaisha Kobe Seiko Sho since 1993 and I have a total of 10 years of work and research experience in the field of surface processing and corrosion of metal sheet.

3. The following experiments were carried out by me or under my direct supervision and control.

4. The attached Figs. A-B compare the corrosion resistance provided by conventional zinc rich paint with the corrosion resistance provided by the paint of the present invention, which combines metallic zinc powder and metal salt rust inhibitor.

5. Fig. A shows the variation in corrosion (red rust area) with paint zinc content in a corrosion test comparing a conventional zinc rich paint (including zinc but no metal salt rust inhibitor additive) and an anticorrosive paint coating of the present invention (including both zinc powder and a metal salt rust inhibitor additive). The term "CCT-JASO" refers to the JASO-M609 test described in the specification at pages 7-8. The term "cycle" refers to the cycle described in the specification at page 8, line 2.

The "conventional zinc rich paint" (which corresponds in zinc content to Sample No. 2 of Table 1 in the specification at page 10) had a zinc content of 65% but no metal salt rust inhibitor

The paint "with additives" of the present invention (which corresponds to Sample No. 7 of Table 1 in the specification at page 10) also had a zinc content of 65% and included as a metal salt rust inhibitor 1.89% of magnesium phosphate (average particle diameter:0.45μm) and 3.52% of aluminum phosphomolybdate (average particle diameter:0.38μm).

Fig. A shows that the paint of the present invention (combining zinc and metal salt rust inhibitor) provides a significant improvement in red rust corrosion resistance when the paint contains more than 40%, particularly more than 55%, of zinc. In contrast, the conventional zinc rich paint (with no metal salt rust inhibitor) has relatively little effect on red rust corrosion resistance, even when the zinc content is varied.

6. Fig. B shows the variation in corrosion depth with paint film thickness in a corrosion test comparing a conventional zinc rich paint (including zinc but no metal salt rust inhibitor additive) and an anticorrosive paint coating of the present invention (including both zinc powder and metal salt rust inhibitor "additive type A"). The term "cycle" refers to the cycle described in the specification at page 8, line 2.

The "conventional zinc rich paint" (which corresponds in zinc content to Sample No. 2 of Table 1 in the specification at page 10) had a zinc content of 65% but no metal salt rust inhibitor.

The paint "with additives type A" of the present invention (which corresponds to Sample No. 1 of Table 1 in the specification at page 10) also had a zinc content of 65% and included as a metal salt rust inhibitor 5.83% of aluminum phosphomolybdate (average particle diameter:0.38μm).

In Fig. B, the terms "CR", "GA45" and "GI60" refer to comparative samples uncoated by paint. The term "CR" refers to cold rolled steel sheet. The term "GA45" refers to hot dip galvanized steel sheet containing 45g/m^2 of zinc alloy plating. The term "GI60" refers to hot dip galvanized steel sheet containing 60g/m^2 of zinc plating.

Fig. B shows that conventional zinc rich paint provides no improvement in corrosion resistance relative to the unpainted samples, even when the paint film thickness is varied. In addition, Fig. B shows that corrosion depth decreases somewhat with paint film thickness for both the paint of the present invention and conventional zinc rich paint.

Fig. B also shows that for a given film thickness the paint of the present invention (combining zinc and metal salt rust inhibitor) provides a significant reduction in corrosion depth relative to conventional zinc rich paint (with no metal salt rust inhibitor).

7. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

8. Further declarant saith not.

Date: October 24, 2023

/Hiroo SHIGE/

Hiroo SHIGE

Attachments: Figs. A-B

Corrosion Resitance Data

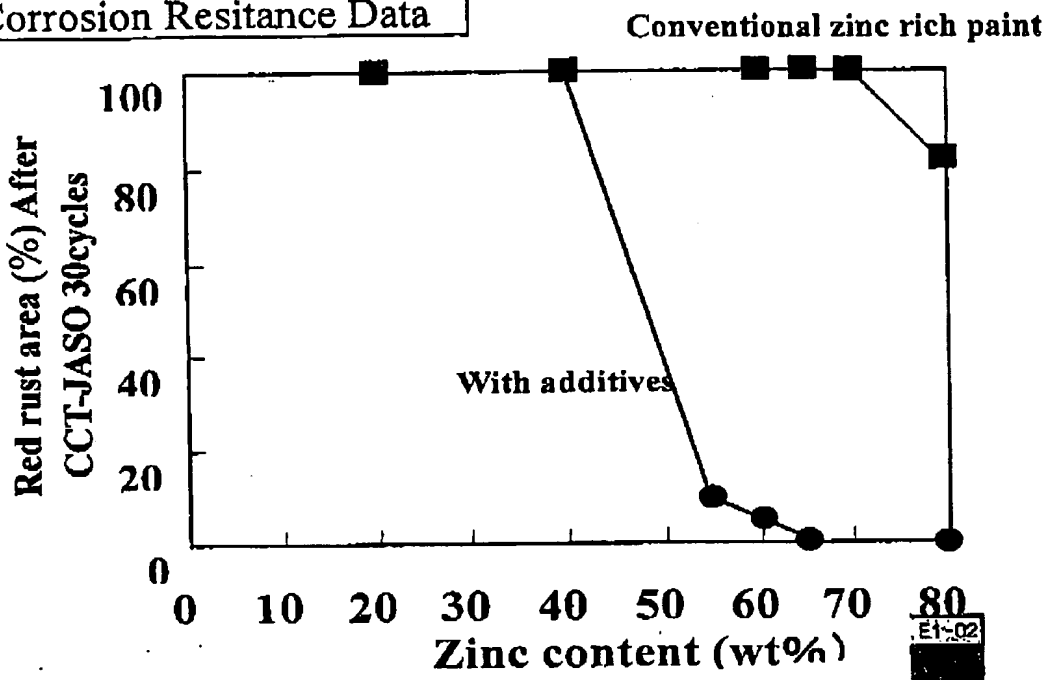

Fig. A

Perforation

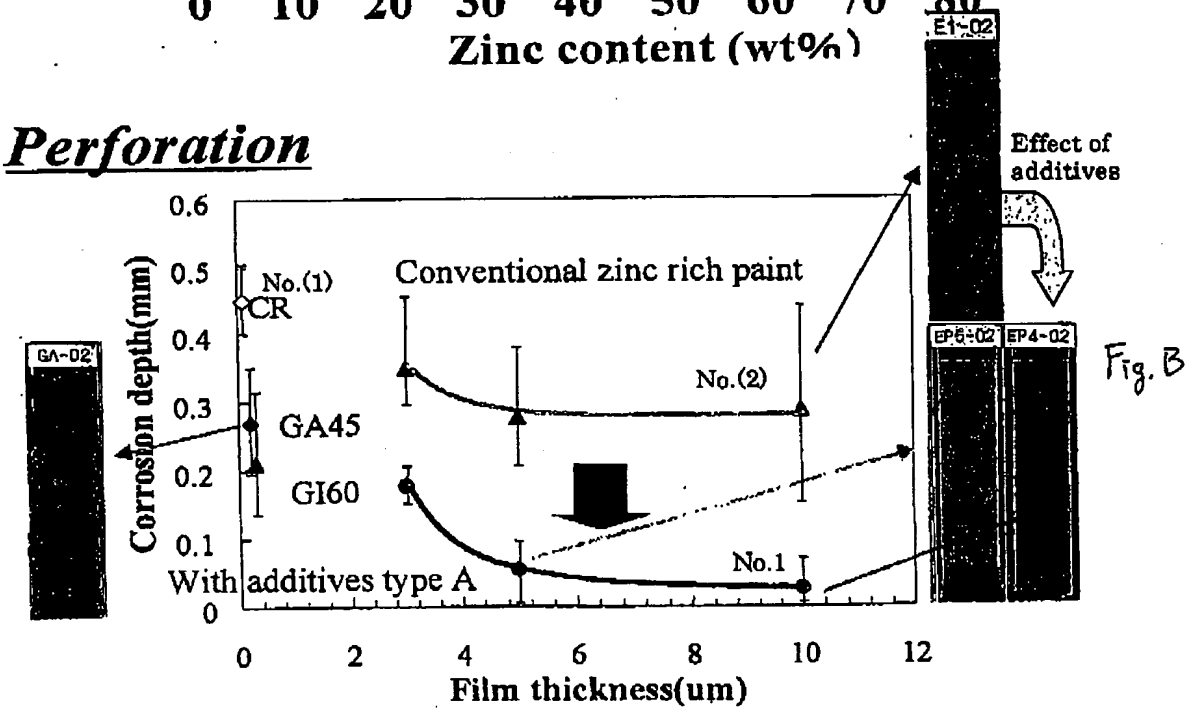

Fig. B

Maximum corrosion depth after 90cycles